

PremAire® Cadet Escape Respirator: Cylinder and Valve

MAINTENANCE AND REPAIR

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**MINE SAFETY APPLIANCES COMPANY
PITTSBURGH, PENNSYLVANIA, U.S.A. 15230**

CYLINDER AND VALVE

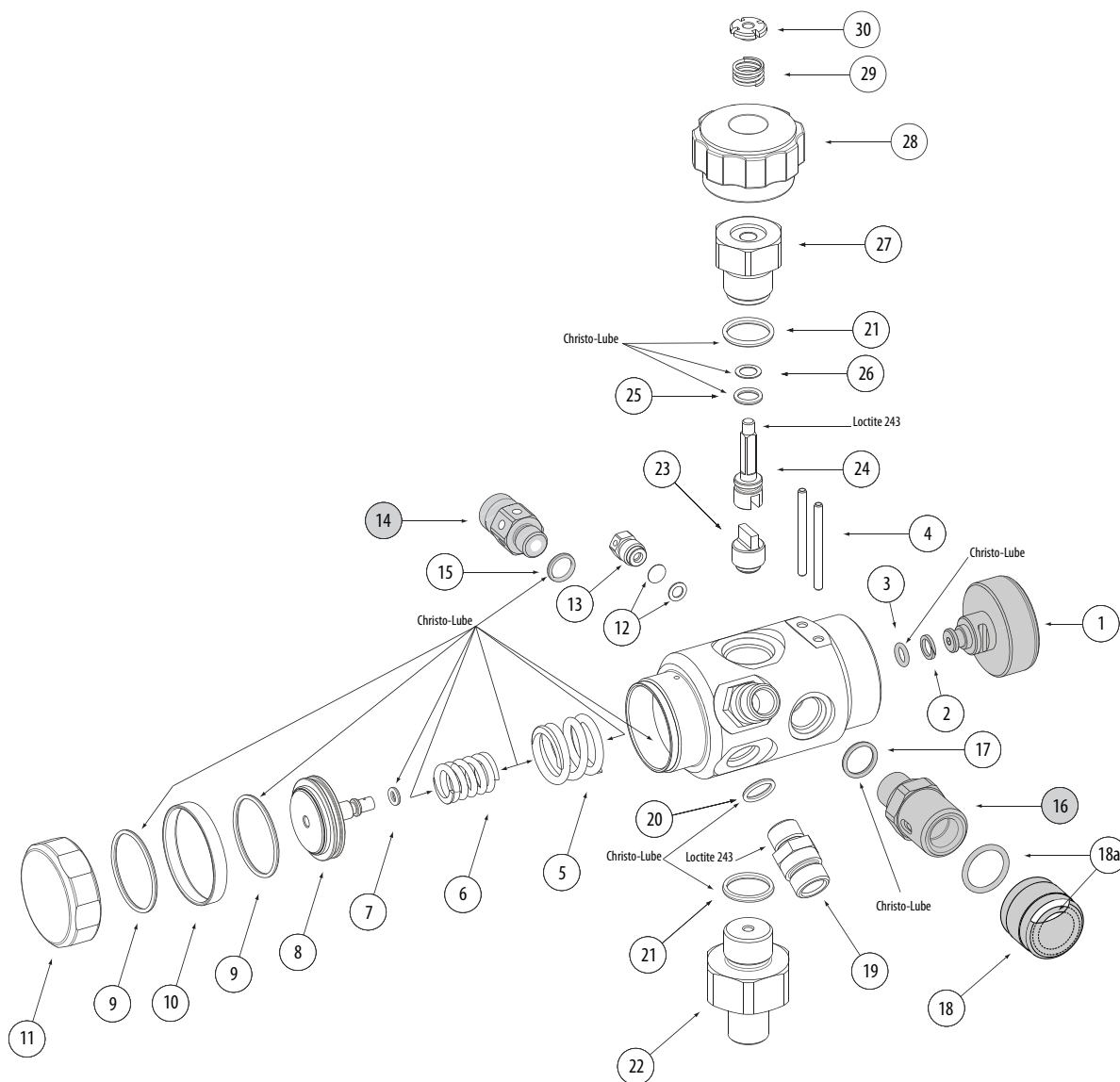
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CYLINDER AND VALVE

Item	P/N	Description
1	10075662	Gauge Assembly (complete)
2	635278	Back-up Ring
3	63198	O-ring
4	10060571	Pins (2 req'd)
5	10050620	Spring, Outer, Regulator
6	10050621	Spring, Inner, Regulator
7	10052364	O-ring
8	10050617	Piston Assembly
9	10052365	O-ring
10	10052621	Seal Ring
11	10050623	Cap, Regulator
12	10094974	Burst Disc and Gasket Kit, 2216 psig
	10094975	Burst Disc and Gasket Kit, 3000 psig
13	10070678	Plug
14	10078801	Pressure Relief Valve Assembly (complete)
15	635037	O-ring
16	10060555	Fill Port Assembly (complete)
17	10073505	O-ring
18	10088636	Cap, Fill Port
18a	10052365	O-ring
19	805052	Adapter Hose (2 req'd)
20	633776	O-ring (2 req'd)
21	10073506	O-ring (2 req'd)
22	10070680	Adapter, 5 Min. Carbon / 10 Min. Carbon
	10070679	Adapter, 5 Min. Aluminum
	10070841	Adapter, 10 Min. Aluminum / 15. Min Carbon
23	488858	Insert
24	10070675	Stem
25	10073504	O-ring
26	10073510	Washer
27	10070576	Fitting, Cylinder Valve
28	91728	Knob
29	10073769	Spring
30	83731	Locknut
	480000184	Loctite 243
	604070	Christo-Lube Lubricant

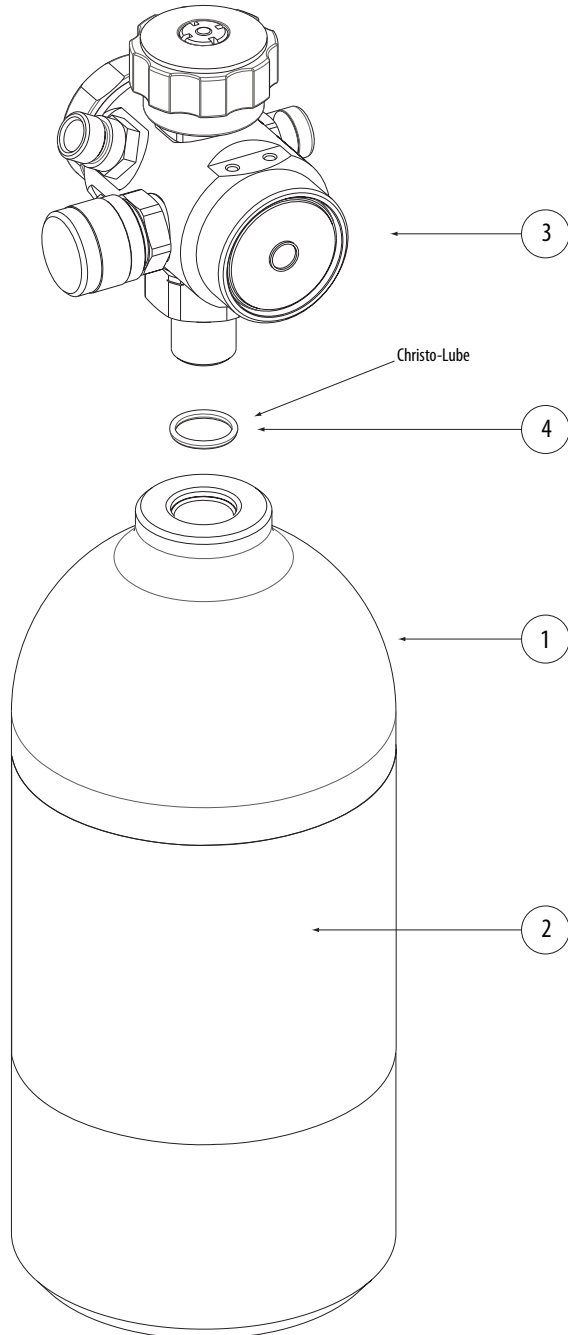
CYLINDER AND VALVE



CYLINDER AND VALVE

Cylinder and Valve Assembly (complete)

P/N	Description
10061364	5 Minute, Aluminum
10061365	10 Minute, Aluminum
10061366	5 Minute, Carbon, 3000 psig
10061367	10 Minute, Carbon, 3000 psig
10065044	Christo-Lube Lubricant



Parts List

Item	P/N	Description
1	818157	5 Min. Aluminum Cylinder, 2216 psig
	10042390	5 Min. Carbon Cylinder, 3000 psig
	802190	10 Min. Aluminum Cylinder, 3000 psig
	10042391	10 Min. Carbon Cylinder, 3000 psig
	10065043	15 Min. Carbon Cylinder, 3000 psig
2	10061372	Label, 5 Min. Aluminum
	10061374	Label, 5 Min. Carbon
	10061373	Label, 10 Min. Aluminum
	10061375	Label, 10 Min. Carbon
3	10061376	Label, 15 Min. Carbon
	10061362	5 Min. Aluminum Valve Assembly
	10061361	5 Min. Carbon / 10 Min. Carbon Valve Assembly
4	10061363	10 Min. Aluminum / 15 Min. Carbon Valve Assembly
	68542	O-ring, 5 Min. Aluminum
	633549	O-ring, 5 Min. Carbon / 10 Min. Carbon
	633550	O-ring, 10 Min. Aluminum / 15 Min. Carbon
	604070	Christo-Lube Lubricant

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DISASSEMBLY

Valve Assembly

1. Depressurize the cylinder.
 - a. Secure the cylinder in a suitable fixture.
 - b. Partially open the cylinder valve by turning the knob counterclockwise no more than a quarter turn.
2. When airflow stops and the gauge reads 0 psi, remove the cylinder valve from the cylinder.
 - a. Use the 1 1/4" wrench to unscrew the cylinder adapter.

⚠ WARNING

Depressurize the cylinder before attempting to remove the cylinder valve. Removing the cylinder valve from a pressurized cylinder can cause the cylinder and/or cylinder valve to become airborne projectiles. Failure to follow this warning can result in serious personal injury or death.

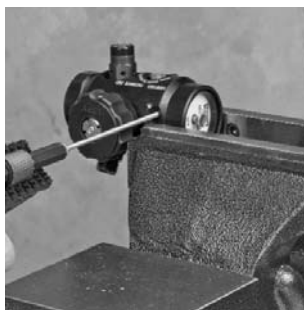
Pressure Gauge

1. Remove the pins one at a time.

- a. Secure the valve body by the flats in a vise. Ensure that both ends of one pin opening are exposed.



- b. Insert the 1/8" punch into the exposed pin opening.



- c. Use a lightweight ball peen hammer to tap the pin through the valve body.



2. Repeat the procedure to remove both pins.
3. Remove the gauge.

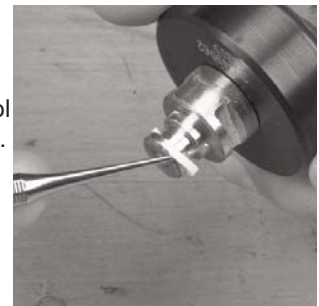
Note: If necessary, use the plastic stick to remove the gauge.



4. Use the o-ring removal tool to remove the o-ring.



5. Use the o-ring removal tool to remove the backup ring.



Regulator Cap, Piston and Springs

Stem 10070675

1. Use a vise with flat and smooth jaws. Do not use protective sleeves. Secure the valve body in the vise.

2. Use the o-ring removal tool to remove the seal ring.



CYLINDER AND VALVE

3. Use the 1 5/8", 6 point socket and breaker bar to unscrew the cap.



4. Use the o-ring removal tool to remove the cap o-ring. Discard the o-ring.



5. Use the stem to remove the piston.

Note: Use a new valve stem or remove all traces of sealant from used valve stems before attempting to remove the piston.

- a. Screw the stem into the piston and gently pull out the piston.



- b. Unscrew the valve stem.

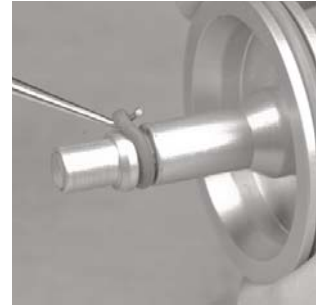
6. Use the o-ring removal tool to remove the piston o-ring.

Note: Be careful not to scratch the o-ring groove.



7. Use the o-ring removal tool to remove the piston head o-ring.

Note: Be careful not to scratch the o-ring groove.



8. Remove the inner and outer springs.

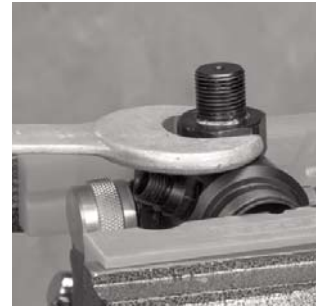


Cylinder Adapter

1. Secure the valve body in a vise, as shown.

Note: Use protective sleeves on the jaws of the vise.

2. Use a 1 1/4" wrench or socket and breaker bar to unscrew the cylinder adapter.



3. Use the o-ring removal tool to remove the cylinder adapter o-ring.

Note: Be careful not to scratch the o-ring groove.



Handwheel and Insert

1. Secure the valve body in a vise, as shown.

Note: Use protective sleeves on the jaws of the vise.

CYLINDER AND VALVE

2. Use the locknut wrench to unscrew the locknut.



3. Remove the locknut.



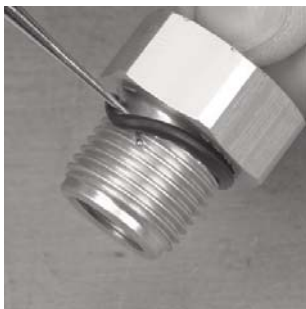
4. Remove the spring.



5. Use the 1" socket and breaker bar unscrew the cylinder valve fitting.



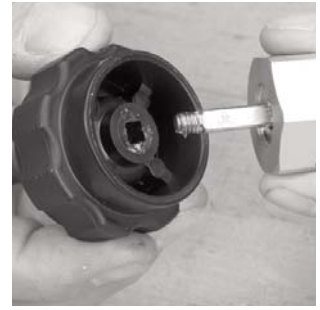
6. Use the o-ring removal tool to remove the cylinder valve fitting o-ring.



Note: Be careful not to scratch the o-ring groove.

7. Remove the stem

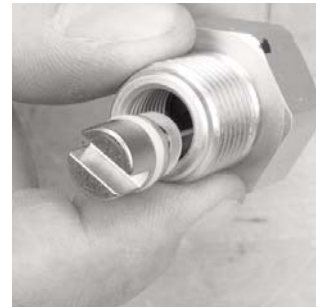
- a. Use the handwheel as a wrench and turn clockwise to unscrew the insert.



- b. Remove the insert.



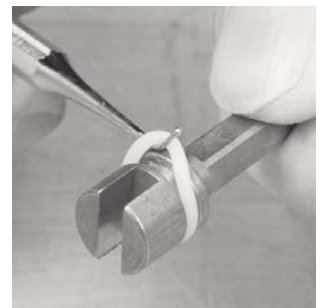
- c. Remove the stem.



- d. Remove the washer.



- e. Use the o-ring removal tool to remove the o-ring.



CYLINDER AND VALVE

Note: Be careful not to scratch the o-ring groove.

Pressure Relief Valve

1. Secure the valve body in a vise, as shown.

Note: Use protective sleeves on the jaws of the vise.

2. Use the 5/8" wrench, or deep well socket and breaker bar to unscrew the pressure relief valve.



3. Use the o-ring removal tool to remove the o-ring.



Note: Be careful not to scratch the o-ring groove.

Burst Disc and Gasket

1. Secure the valve body in a vise, as shown.

Note: Use protective sleeves on the jaws of the vise.

2. Use the 3/8" socket and breaker bar to unscrew the plug.



3. Remove the valve body from the vise. Invert the valve body to allow the burst disc and washer to fall out. Discard the burst disc and washer.



Hose Adapter(s)

1. Use the 5/8" wrench, or socket and breaker bar to unscrew the hose adapter(s).



2. Use the o-ring removal tool to remove the o-ring.



Note: Be careful not to scratch the o-ring groove.

Fill Port

1. Unscrew the fill port cap.



2. Use the o-ring removal tool to remove the o-ring.



3. Use the 7/8" wrench, or socket and breaker bar to unscrew the fill port.



CYLINDER AND VALVE

4. Use the o-ring removal tool to remove the o-ring.

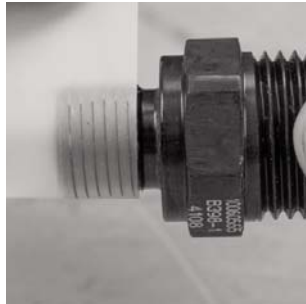
Note: Be careful not to scratch the o-ring groove.

REASSEMBLY

Fill Port

Fill Port Assembly (Complete)	10060555
O-Ring	10073505
Cap, Fill Port	10088636
O-Ring (2 req'd)	10052365
Christo-Lube Lubricant	604070
Loctite 243	480000184

1. Install a new port o-ring.
a. Apply a small amount of Christo-Lube Lubricant to the port o-ring.



b. Protect the o-ring from the thread with tape or paper.

c. Apply a small amount of Christo-Lube Lubricant to a new o-ring.

d. Install the o-ring.



e. Remove the protector.

2. Apply a small amount of Christo-Lube Lubricant to the valve body o-ring gland.

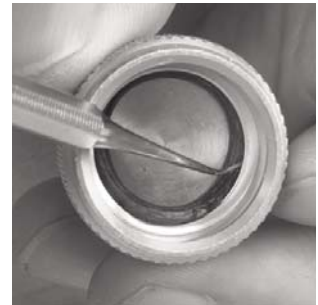


3. Screw the fill port into the valve body.

4. Use the 7/8" socket and foot-pound torque wrench to tighten to 30 ± 2 ft lbs.



5. Install the cap.
a. Apply a small amount of Christo-Lube Lubricant to a new cap o-ring.



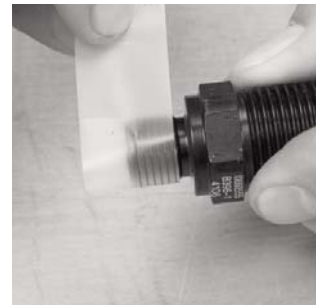
b. Install the o-ring

c. Screw on the cap.



Hose Adapter(s)

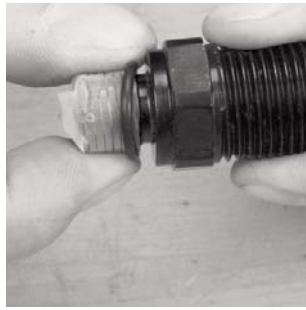
1. Protect the o-ring from the thread with tape or paper.



2. Apply a small amount of Christo-Lube Lubricant to the o-ring.

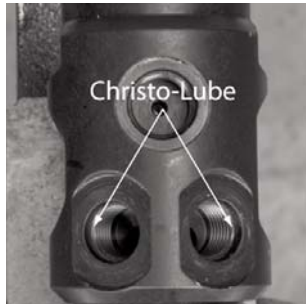
CYLINDER AND VALVE

3. Install the o-ring.



4. Secure the valve body in a vise with flat and smooth jaws. **Do not use protective sleeves.**

5. Apply a small amount of Christo-Lube Lubricant to the shoulders of the adapter holes.



6. Apply two drops of Loctite 243 to the thread, as shown.



7. Screw the hose adapter(s) into the valve body.

- d. Use the 5/8" socket and inch-pound torque wrench to tighten to 125 ± 5 in lbs.



Burst Disc and Gasket

Burst Disc Kit, 2216 psig 10094974
 Burst Disc Kit, 3000 psig 10094975
 Plug 10070678

1. Secure the valve body in a vise with flat and smooth jaws. Do not use protective sleeves.
2. Place a thin film of Snoop on both sides of the new burst disc. Soak the washer and burst disc in Snoop.

3. Install the gasket.



4. Install the burst disc.



⚠ WARNING

Install the gasket, then burst disc as instructed. Ensure threads of the burst disc area and safety plug threads are free of Christo-Lube Lubricant. Do not reuse the burst disc or gasket. Failure to install properly may cause burst disc malfunction resulting in serious personal injury or death.

5. Screw the plug into the valve body.

6. Use the 3/8" socket and inch-pound torque wrench; tighten to 90 ± 10 in. lbs.



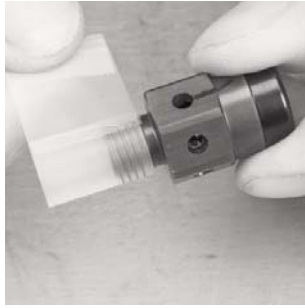
Pressure Relief Valve

Pressure Relief Valve Assembly (Complete) 10078801
 O-Ring 635037

1. Use a vise with flat and smooth jaws. Do not use protective sleeves. Secure the valve body by the flats.
2. Install a new o-ring.

CYLINDER AND VALVE

- a. Protect the o-ring from the thread with tape or paper.



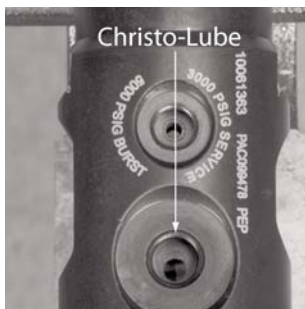
- b. Apply a small amount of Christo-Lube Lubricant to a new o-ring.



- c. Install the o-ring.



- d. Remove the protector.



3. Apply a small amount of Christo-Lube Lubricant to the valve body o-ring gland.



4. Screw the relief valve into the valve body.

5. Use the 5/8" socket and inch-pound torque wrench to tighten to 90 +/- 10 in. lbs.



1. Secure the valve body in a vise with flat and smooth jaws. Do not use protective sleeves.
2. Install new o-rings.



- a. Protect the o-rings from the thread with tape or paper.

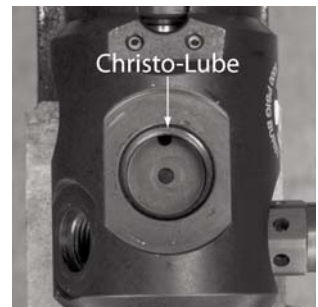


- b. Apply a small amount of Christo-Lube Lubricant to the new o-ring.

- c. Install the o-ring.



- d. Remove the protector.



3. Apply a small amount of Christo-Lube Lubricant to the valve body o-ring gland.

4. Screw the plug into the valve body.
5. Use the 1 1/4" socket and foot-pound torque wrench to tighten to 30 ± 2 ft. lbs.

CYLINDER AND VALVE

Note: Ensure that the cylinder adapter is flush with valve body.

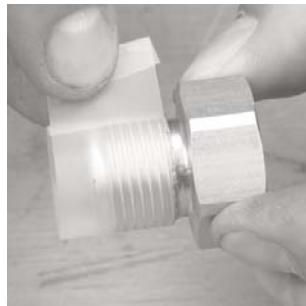


Handwheel and Insert

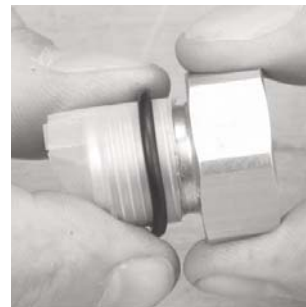
O-Ring	10073506
Stem	10070675
O-Ring	10073504
Washer	10073510
Handwheel	91728
Spring	10073769
Locknut	83731
Christo-Lube Lubricant	604070

1. Install a new cylinder valve fitting o-ring.

a. Protect the o-rings from the thread with tape or paper.



b. Apply a small amount of Christo-Lube Lubricant to the new o-ring.



c. Install the o-ring.



d. Remove the protector.

3. Assemble the stem.

- a. Apply a small amount of Christo-Lube Lubricant to the new o-ring.
- b. Pass the o-ring carefully over the threaded end of the stem. Use the o-ring removal tool to stretch the o-ring into the groove.

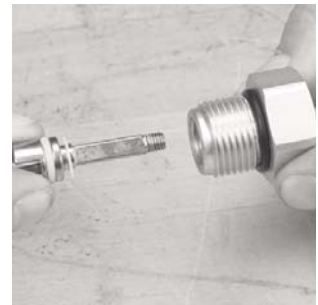
Note: Be careful not to scratch the o-ring groove.



- c. Apply a small amount of Christo-Lube Lubricant to both sides of a new washer.



d. Install the washer.



4. Insert the stem into cylinder valve fitting.



5. Align the stem tab with the insert slot and install the insert.

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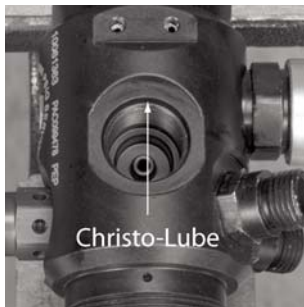
6. Turn the insert counter-clockwise to engage the thread.



7. Use the handwheel to continue turning until the insert is flush with the fitting.



8. Apply a small amount of Christo-Lube Lubricant to the valve body o-ring gland.



9. Install into housing.



Note: Use a vise with flat and smooth jaws. Do not use protective sleeves. Secure the valve body by the flats.

10. Use a 1" socket and foot pound torque wrench to tighten the fitting to 30 ± 2 ft. lbs.



11. Apply one drop of Loctite 243 to the stem.



12. Install the handwheel.



13. Install the spring.



14. Install the locknut.



15. Use the locknut wrench to tighten the nut until it is flush with the handwheel.



CYLINDER AND VALVE

Regulator Cap, Piston and Springs

Inner Spring	10050621
Outer Spring	10050620
Piston O-Rings	10052364
	10052365
O-Ring	10052365
Regulator Cap	10050623
Seal ring	10052621
Christo-Lube Lubricant	604070

1. Apply a small amount of Christo-Lube to the spring chamber bore.



2. Apply a small amount of Christo-Lube Lubricant to both ends of the outer spring.



- a. Install the spring.

3. Apply a small amount of Christo-Lube Lubricant to both ends of the inner spring.



- a. Install the spring.

4. Install the piston o-rings.
 - a. Apply a small amount of Christo-Lube Lubricant to the small o-ring.

- b. Install the small o-ring.



- c. Apply a small amount of Christo-Lube Lubricant to the large o-ring.

- d. Install the large blue o-ring.



5. Insert the piston into the chamber and press into place.



6. Install the regulator cap o-ring.
 - a. Apply a small amount of Christo-Lube Lubricant to a new o-ring.
 - b. Install the o-ring.

7. Screw on the regulator cap.

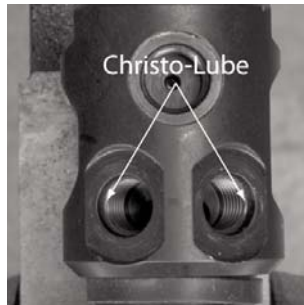


CYLINDER AND VALVE

- Use the foot-pound torque wrench and 1 5/8" socket, 6 point socket to tighten to 40 ± 2 ft. lbs.



- Install a new seal ring, flat side out.



Pressure Gauge (ball peen hammer method)

Gauge Assembly (Complete)	10075662
Back-up Ring	635278
O-Ring	63198
Pins (2 req'd)	10060571

- Install a new o-ring and back-up ring.
 - Apply a small amount of Christo-Lube Lubricant to the back-up ring.



- Install a new back-up ring.



- Install a new o-ring.

- Install the gauge into the port with the MSA logo at the bottom.



- Use the 1/8" long drive pin punch to verify proper orientation.



Note: Use a vise with flat and smooth jaws. Do not use protective sleeves. Secure the valve body by the flats. Ensure that one pin opening is exposed.



- Insert a new pin and use the ball peen hammer to drive it into the housing until the pin is flush with the flat housing.



- Repeat with the second pin.

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Valve Assembly

O-Ring, 5 Min. Aluminum 68542
 O-Ring, 5 Min. Carbon/10 Min. Carbon 633549
 O-Ring, 10 Min. Aluminum/15 Min. Carbon 633550

1. Secure the cylinder in a suitable fixture.
2. Using a high intensity light, inspect the inside of the cylinder for contaminants. Remove any loose particles. Be sure the cylinder interior is completely dry.
3. Clean the o-ring sealing surface on the cylinder with a clean, dry, lint-free cloth. Be sure that the cylinder surface is undamaged and free from contaminants, such as dirt or tape adhesive residue. Use a clean, lint-free rag dampened with wood alcohol if required.
4. Inspect the cylinder neck area. Do not use the cylinder if it has scratches, cuts or grooves which may prevent an air tight seal.
5. Apply a thin film of lubricant (Christo-Lube) P/N 604070 to the o-ring.
6. Apply one drop of lubricant (Christo-Lube) P/N 604070 1/16" in diameter, in 2 places, 180 degrees apart in the o-ring groove of the valve.
7. Place a plastic thread protector or thin piece of paper over the threads of the valve, then roll the o-ring over the thread protector and into the o-ring groove. Rotate the o-ring 1/2 to 3/4 turns and remove the thread protector.
8. Insert the cylinder valve into the cylinder neck slowly and carefully so that the sealing surface of the cylinder is not damaged by the tube or sharp edge of the valve threads.
9. Tighten the valve into the cylinder according to the torque requirements for the cylinder and valve assembly. Refer to the table below.

Note: Apply torque to the adapter only.

P/N	Description	Torque
10042390	5 Min. Carbon Cylinder, 3000 psig	30-35 ft. lbs.
10042391	10 min. Carbon Cylinder, 3000 psig	
818157	5 Min. Aluminum Cylinder, 2216 psig	40-45 ft. lbs.
802190	10 Min. Aluminum Cylinder, 3000 psig	
10065043	15 min. Carbon Cylinder, 3000 psig	